Designing Professional Development Workshops to Foster Critical Thinking Skills in Hybrid Learning Environments in Higher Education

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Professional Experience

- **Graduate/Undergraduate Teaching Assistant (TA) for courses:** Questionnaire Design, Program Evaluation, Educational & Cultural Divers
- **Instructional Designer of courses and projects:** Developed standard operating procedures (SOPs) to enhance organizational efficiency.

Publications & Activities

- Applying the Socratic Questioning Method in the AI Age: Fostering Critical Thinking in Higher Education, (Encyclopedia of Modern Artificial Intelligence), 2025
- Empowering Preservice Teachers' Critical Thinking through AI-Enhanced Hybrid Learning Environments, (International Conference on AI in Education), 2025
- Rethinking Assessment in the Age of AI to Enhance Higher-Order Thinking in Higher Education, (FICTA Conference), 2025
- Developing Critical Thinking in Blended Learning: Evidence-Based Instructional Design Strategies, (International Conference on Blended Learning Strategies), 2025
- Designing Professional Development Workshops to Foster Critical Thinking in Hybrid Learning, (IARIA eLmL Conference), 2025
- The Socratic Questioning Method in the Age of AI in Higher Education, (EdMedia Conference, AACE), 2025
- Developing a School and Community-Based STEM Research Ecosystem (Co-authored), (Frontier), 2025

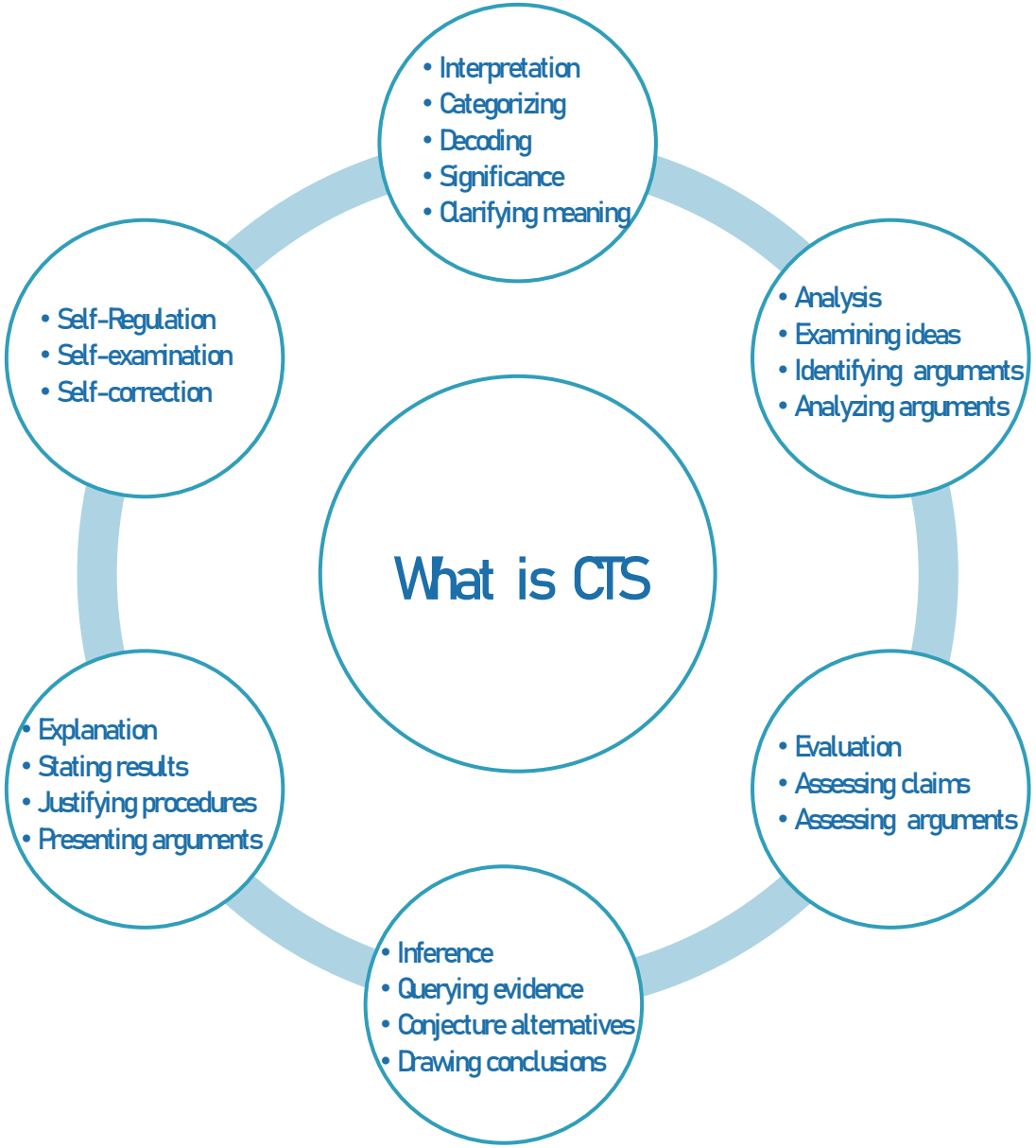
Introduction

Critical Thinking Skills (CTS) are essential for 21st-Century workforce success.

Hybrid Learning (HL) environments require adaptive Instructional Strategies.

Professional Development (PD) workshops equip educators to embed CTS into HL.

❖ Introduction



❖ Previous Studies

Previous Studies

1. CTS & HL/OL setting

- **Doe & Smith (2020):** HL foster CTS through flexible HL instruction.
- **Johnson (2019):** How CTS frameworks, digital tools, and collaboration boost CTS engagement.

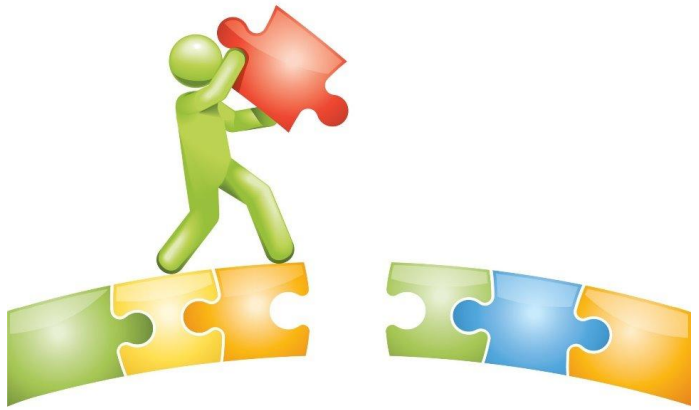
2. CTS and HE

- **Elnath (2017); Putra et al. (2021):** Importance of integrating CTS into preservice teacher education
- **Huber & Kuncel (2016):** HE promotes CTS in OL, with curriculum integration supported by scholars.

3. Employer perception vs. CTS outcomes in HL

- **American Association of Colleges (2015):** Only 26% of employers find that students CTS ready.
- **Habiburrahim (2016), López-Pérez et al. (2011):** Digital learning poses challenges for CTS.

❖ Research Gaps



- Lack of outlined instructional design models and effective strategies in HL for promoting CTS (Graham, 2011; Singh, 2003).

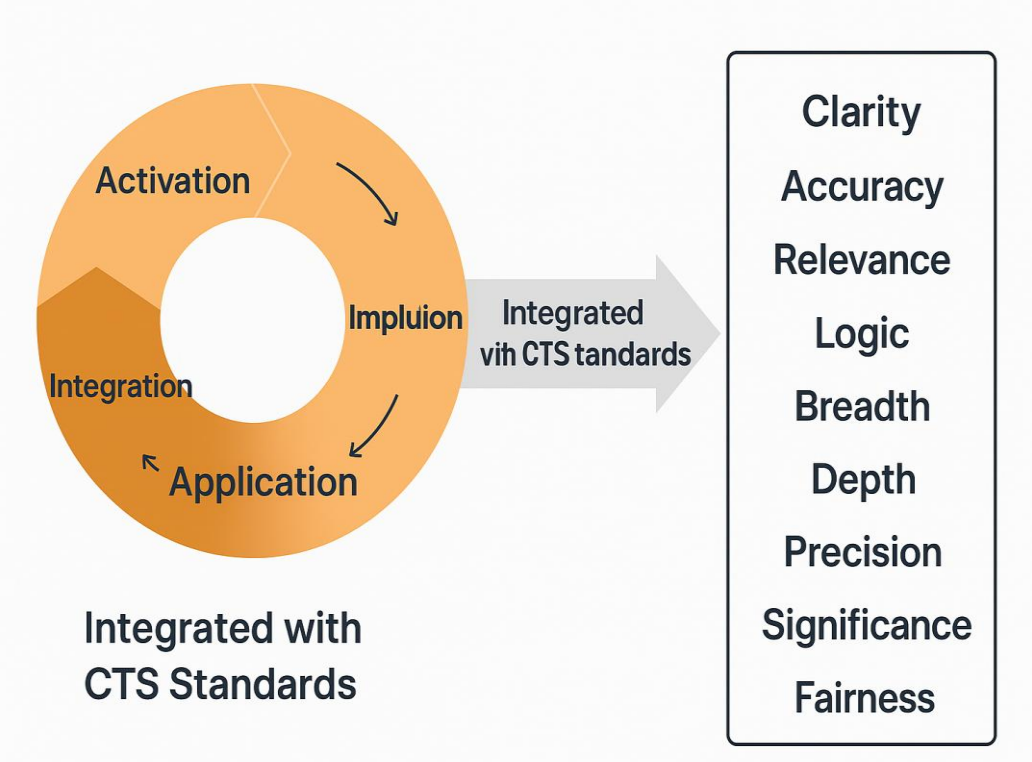
- Scarcity of Research on CTS in Hybrid and Online Setting (Tathahira, 2020).

- Lack of training programs for teachers to teach CTS (Oakes, 2019).

❖ Rationale for Framework Selection

Merrill's First Principles of Instruction and Paul and Elder's Intellectual Standards were chosen for their complementary strengths in promoting CTS in HL. Merrill's model provides a structured, task-based approach to instructional design—ideal for active, applied learning in hybrid settings. Paul and Elder's framework offers clear criteria (e.g., clarity, logic, relevance) to assess and cultivate higher-order thinking (HOT).

These models were selected over others like Bloom's Taxonomy or the SAMR model because they address both how CT is taught (Merrill) and what defines quality thinking (Paul & Elder), making them especially effective for guiding and evaluating professional development for educators.



❖ Research Questions

- How does a professional development workshop influence preservice teachers' understanding and application of CTS strategies in HL environments?
- What instructional design strategies do participants perceive as effective for fostering CTS in HL settings?
- What are the challenges and opportunities associated with integrating CTS strategies using educational technology and AI tools in HL?

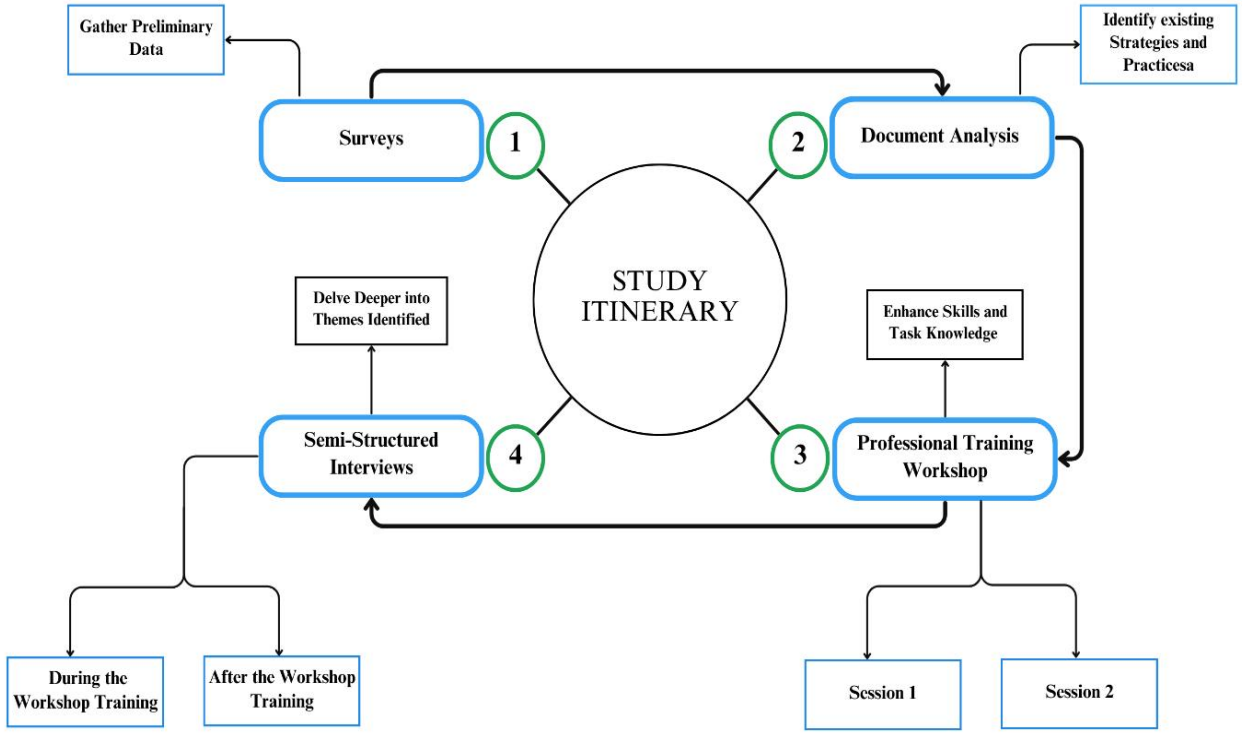
❖ Methods

Research Participants

Participant Group	Description	Estimated Number	Inclusion Criteria
Teaching Assistants	Instructors for the EDCT course 2030	All current TAs for EDCT (Educational Computer Technology) 2030 4	-Must be teaching or assisting in EDCT 2030. -Must have hybrid teaching experience. -Instructor must be from Patton College of Education
Preservice Teachers	Students enrolled in the course EDCT 2030	All enrolled preservice teachers 10	-Must be enrolled in EDCT 2030 -Must have taken at least 1 course in Hybrid or online before. -Students must be from Ohio University.

❖ Methods (Cont'd)

Research Procedures



Methods (Cont'd)

Step 1: Survey

Survey For TAs	Survey for Preservice Teachers
• **For Teacher/Instructor** 1. What is your current role? 2. How many years of teaching experience do you have? 3. Have you taught or participated in HL courses before? If yes, please describe your experience. 4. How would you define CTS? 5. How important do you believe CTS are in your teaching practice? 6. What strategies do you currently use to promote CTS in your classroom? 7. Have you used Merrill's Principles of Instruction in your teaching? If yes, how? 8. Have you used Paul and Elder's Intellectual Standards in your teaching? If yes, how? 9. What challenges do you face when trying to integrate CTS into your teaching?	• **For Pre-service Teacher** 1. What is your current program of study or major? 2. What grade levels or subjects are you preparing to teach? 3. How familiar are you with HL environments? 4. What is CT and how important do you believe CTS are in your future teaching practice? 5. What strategies have you learned to promote CTS in your field experiences? 6. What challenges do you face in integrating CTS into your practices? 7. Are there specific topics related to CTS and HL that you feel need more emphasis in your preparation program? 8. Do you have any feedback or suggestions on how to improve the support and training for CTS and HL environments?

Method (Cont'd)

Step 2: Document Analysis

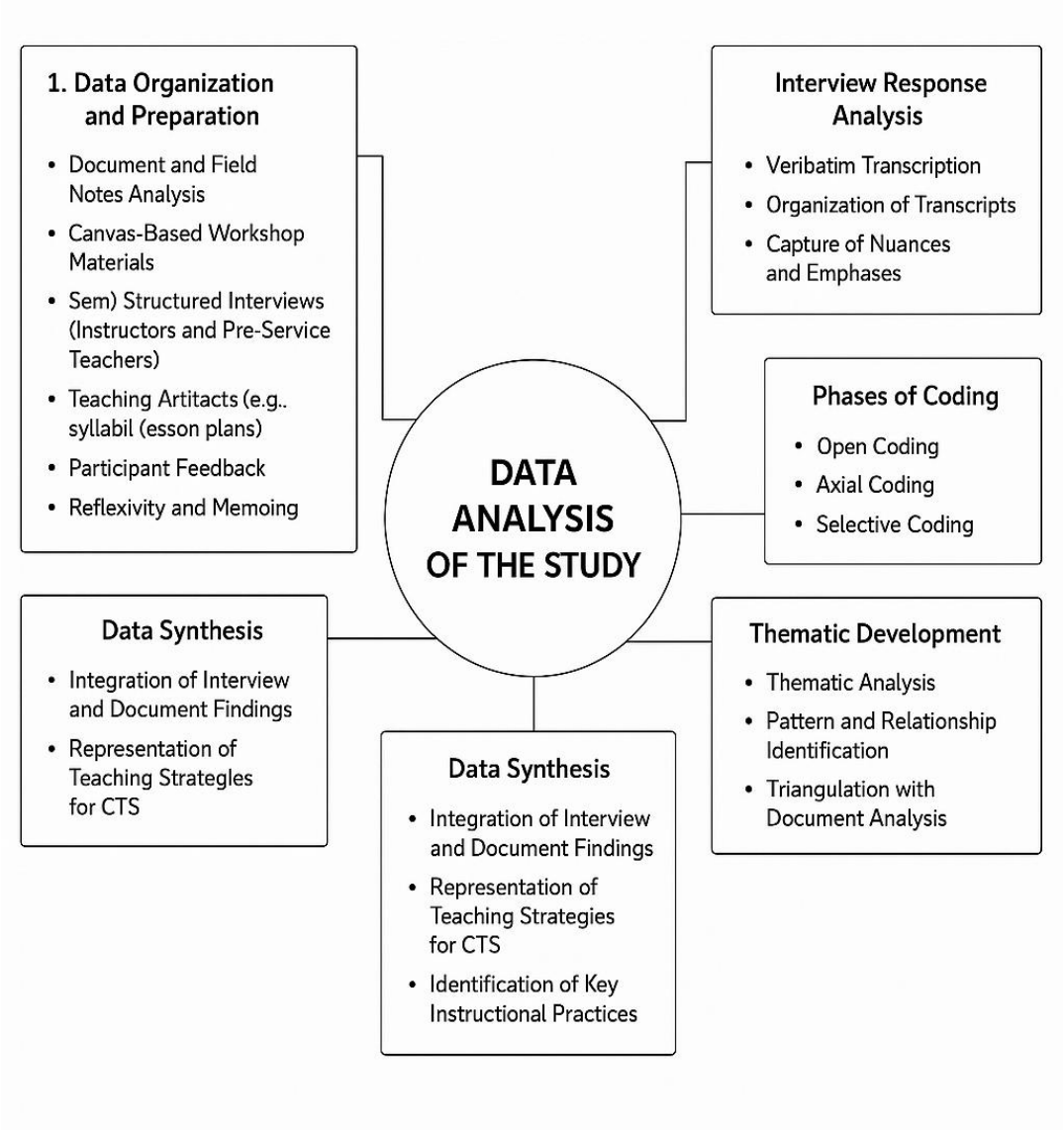
Steps	Document Type	Process	Example
1. Organizing Materials	Lesson Plans, Syllabi, Assignments	- Collecting all materials related to the EDCT 2030 course (lesson plans, syllabi, assignments, handouts, online resources). - Labeling and categorizing each document by type and purpose for easier reference.	Create folders for each type of material (e.g., "Lesson Plans," "Assignments") and subfolders by topic, such as "Week 1 Topics."
2. Initial Coding	Lesson Plans	- Reviewing each lesson plan to identify instances where CTS are mentioned or implied. - Including specific learning objectives, activities that foster CTS. - Applying initial codes, such as "CTS Objective" or "CTS Activity.	A lesson objective could be coded as "CTS Objective" if it states, "Analyzing multiple perspectives on a given topic to foster CTS."
3. Analyzing for CTS Elements	Syllabi, Lesson Plans	- Looking for instructional strategies explicitly linked to promoting CTS: discussions, case studies, or scenario-based learning. - Using Merrill's Principles and Paul & Elder's Standards to assess alignment.	A syllabus section may describe a 'weekly case study' approach, which can be coded as 'Scenario-Based Learning for CTS.'
4. Identifying Patterns and Themes	Assignments, Lesson Plans	- Examining assignments for tasks that require analysis, evaluation, or synthesis, as these indicate a focus on CTS. - Identifying common instructional approaches or activities used to encourage CTS across different materials	An assignment might ask students to "critically evaluate a given scenario," which would be coded as "Eval for CTS."
5. Cross-Referencing with Workshop Goals	All Materials	- Comparing your findings with the workshop's objectives for promoting CTS. - Check for consistency between teachers' planned objectives in lesson plans and the actual strategies used in course materials.	A cross-reference a lesson plan that uses peer discussions to promote CTS with the workshop goal of "Encouraging collaborative CTS activities."
6. Axial Coding for Patterns	All Materials	- Applying axial coding to refine categories and explore relationships between elements, such as "Collaborative Learning (CT)," "Scenario-Based Learning (SBL)," and "Questioning Techniques.	Group all CTS activities that involve student discussions under "CL for CTS."
7. Summarizing Findings	All Materials	- Summarizing key strategies, patterns, and the alignment with CTS goals in a document. - Noting both effective practices and areas for improvement.	Report on trends like, "All lesson plans incorporate CTS activities, primarily through discussion and case studies."

Methods (Cont'd)

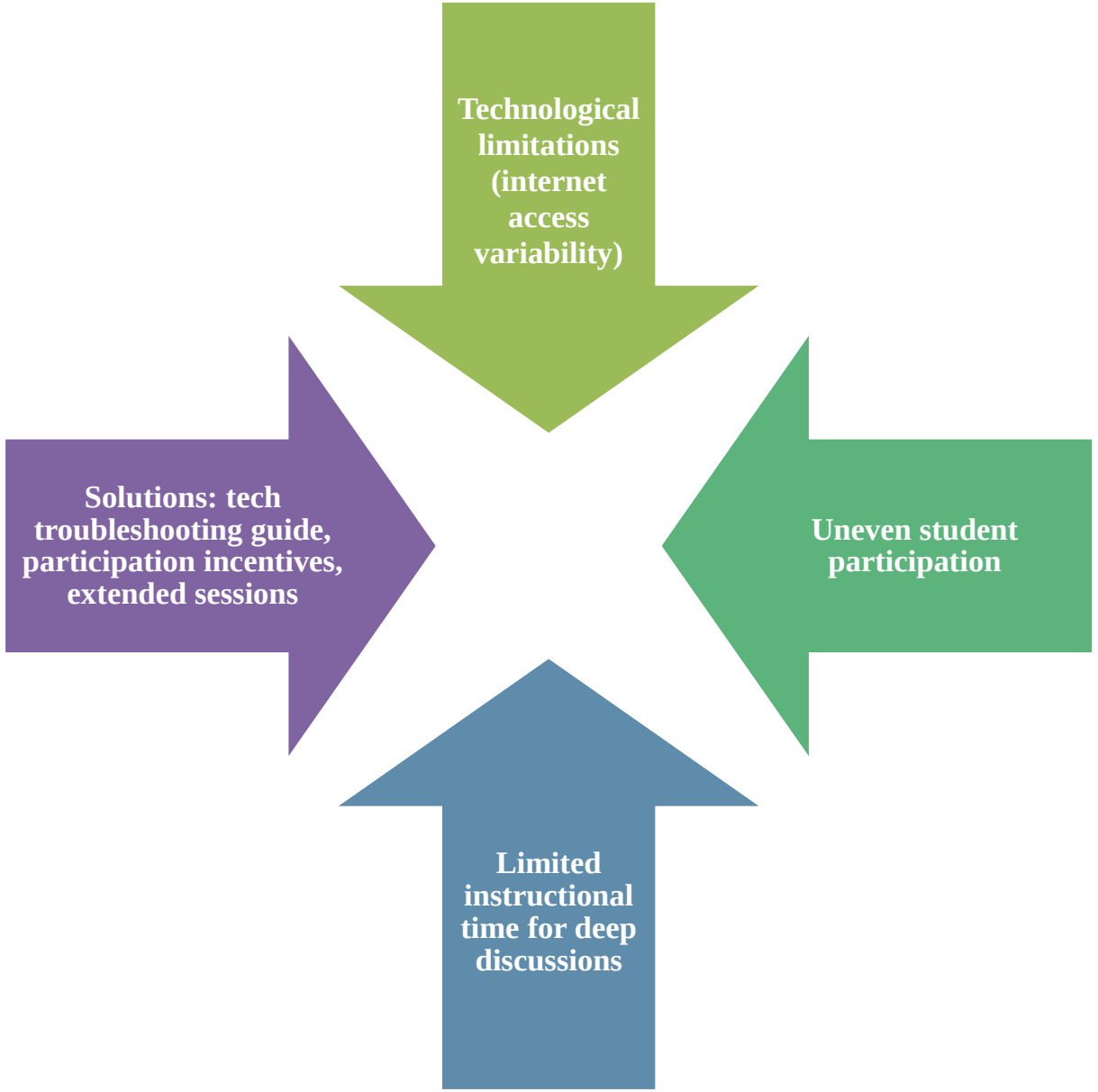
Step 4: After Workshop Semi-Structured Interview

For Teacher/TAs	For Pre-service Teacher
1. Before we proceed, could you please share your understanding or definition of CTS as it pertains to HL?	1. Before taking courses with teachers who attended the workshop, how would you describe your understanding of CTS?
2. How have you integrated the strategies learned from the workshop into your teaching?	2. Can you describe any specific teaching practices or strategies used by your teachers that you believe were aimed at developing your CTS?
3. Which activities or strategies introduced so far do you find most effective for promoting CTS?	3. Which specific active learning techniques (e.g., group discussions, problem-solving tasks) did your teachers use to CTS?
4. What specific aspects of their teaching did you find most beneficial for developing your CTS?	4. How did these techniques affect your participation and learning experience in a hybrid setting?
5. Can you provide specific examples of how Elder's model has influenced your students' ability to think critically?	5. What challenges did you encounter when engaging in activities designed to promote CTS in a HL setting?
6. What challenges have you faced in implementing these strategies and models , and how have you addressed them?	

❖ Data Analysis



❖ Challenges and Barriers



❖ Limitations

- **Sample Size and Generalizability**: The study involved a relatively small sample of teacher participants from a single course (EDCT 2030) at one Midwestern university. This limits the generalizability of findings to broader populations or different educational settings.
- **Short-Term Evaluation:** The data were collected shortly after the intervention, which restricts understanding of the long-term impact of the workshop on teaching practices and student outcomes.
- **Self-Reported Data:** Much of the data relied on self-report instruments such as surveys and focus group discussions, which may introduce bias due to social desirability or recall limitations.
- **Technology Context Dependency:** Since the study was embedded in a specific institutional and technological context, the applicability of strategies may vary in institutions with different learning management systems, access to resources, or levels of digital literacy.
- **Instructor Variability:** Differences in how instructors interpreted and implemented the workshop strategies could have influenced the consistency of the intervention’s impact.
- **Lack of Direct Observation of Student Outcomes:** While the focus was on teachers' implementation and perceptions, the study did not directly measure the effects on student critical thinking skill development in a controlled classroom environment

❖ Future Work and Sustainability

Follow-up virtual workshops every semester.

Peer mentoring programs for TAs.

Institutional policies to incentivize active learning adoption.

Future research: AI conversational simulators integration.

❖ Conclusion

- **DBL and SBL are promising strategies for enhancing CTS in hybrid environments.**
- **Workshops increased instructors' instructional competence.**
- **Sustained support structures are crucial for long-term impact.**

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Q&A